General

Guideline Title

ACR Appropriateness Criteria® pulsatile abdominal mass, suspected abdominal aortic aneurysm.

Bibliographic Source(s)

Reis SP, Majdalany BS, AbuRahma AF, Collins JD, Francois CJ, Ganguli S, Gornik HL, Kendi AT, Khaja MS, Norton PT, Sutphin PD, Rybicki FJ, Kalva SP, Expert Panel on Vascular Imaging. ACR Appropriateness CriteriaÂ® pulsatile abdominal mass, suspected abdominal aortic aneurysm. Reston (VA): American College of Radiology (ACR); 2016. 10 p. [84 references]

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Desjardins B, Rybicki FJ, Dill KE, Flamm SD, Francois CJ, Gerhard-Herman MD, Kalva SP, Mansour MA, Mohler ER III, Oliva IB, Schenker MP, Weiss C, Expert Panel on Vascular Imaging. ACR Appropriateness Criteria® pulsatile abdominal mass, suspected abdominal aortic aneurysm. [online publication]. Reston (VA): American College of Radiology (ACR); 2012. 6 p. [65 references]

This guideline meets NGC's 2013 (revised) inclusion criteria.

Recommendations

Major Recommendations

ACR Appropriateness Criteria®

Clinical Condition: Pulsatile Abdominal Mass, Suspected Abdominal Aortic Aneurysm

Variant 1: Pulsatile abdominal mass, suspected abdominal aortic aneurysm.

Radiologic Procedure	Rating	Comments	RRL*
US aorta abdomen	9		O
CTA abdomen with IV contrast	8		☢☢☢
MRA abdomen without and with IV contrast	8		O
CT abdomen without IV contrast	7		☢☢☢
CT abdomen with IV contrast	7		☢☢☢

Radiologic Procedure	Rating	Comments	RRE*
CT abdomen without and with IV contrast	7		☢☢☢☢
MRA abdomen without IV contrast	7		O
Aortography abdomen	4		☢☢☢
FDG-PET/CT abdomen	2		☢☢☢☢
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			***Relative Radiation Level**

Note: Abbreviations used in the table are listed at the end of the "Major Recommendations" field.

Summary of Literature Review

Introduction/Background

Clinical palpation of a pulsating abdominal mass alerts the clinician to the presence of a possible abdominal aortic aneurysm (AAA), a common vascular disorder seen in older individuals, more commonly in male patients with a history of hypertension and smoking. However, the finding of a pulsatile abdominal mass can also be caused by a tortuous abdominal aorta or transmitted pulsations from the aorta to a nonvascular mass.

Generally, an arterial aneurysm is defined as a localized arterial dilatation ≥50% of the normal diameter. The term *ectasia* is applied to arterial dilatations <50% of expected normal diameter. However, the normal dimension of the infrarenal abdominal aorta is up to 2 cm in anteroposterior (AP) diameter. Thus, the infrarenal abdominal aorta is considered aneurysmal if it is ≥3 cm in diameter or ectatic if it is between 2 and 3 cm in diameter. The absolute threshold for aneurysm decreases along the length of the aorta and is about 10% smaller in women than in men.

Imaging studies are important in diagnosing the cause of a pulsatile abdominal mass and, if an AAA is found, in determining its size, involvement of abdominal branches (both visceral and parietal), and any associated significant stenosis or aneurysm involving abdominal visceral and extremity arteries that may aid in treatment planning. Imaging studies should also categorize the extent of aneurysm (i.e., infrarenal aorta; infrarenal aorta and iliac artery; isolated iliac artery; or juxtarenal, suprarenal, or thoracoabdominal aorta). Imaging can also be used for routine surveillance of AAAs.

Currently, elective repair is considered for AAAs ≥5.5 cm in diameter. For smaller AAAs, periodic surveillance is recommended at intervals based on their maximum size: every 6 months for those 4.5 to 5.4 cm in diameter, every 12 months for those 3.5 to 4.4 cm in diameter, every 3 years for those 3.0 to 3.4 cm in diameter, and every 5 years for those 2.6 to 2.9 cm in diameter.

Population-based ultrasound (US) screening studies have been recommended and have proved cost-effective for male patients >65 years of age, despite the fact that one-fifth of all ruptured AAAs occur in these patients. The risk of AAA increases with a history of hypertension, smoking, 3-vessel coronary artery disease, and first-degree male relative with AAA. For AAAs 3 to 5.5 cm in diameter, periodic US or computed tomography (CT) imaging at 6- to 12-month intervals, depending on the rate of aneurysm enlargement on prior studies, is recommended. Other aneurysm characteristics, including saccular morphology of smaller aneurysms, have been associated with an increased risk of rupture below the 5.5-cm size threshold for intervention, and CT angiography (CTA) may be helpful in describing aneurysm morphology in patients with 4.0- to 5.5-cm aneurysms before continued US surveillance. When aneurysms have reached the size threshold for intervention (5.5 cm) or are considered clinically symptomatic, additional preintervention imaging studies should be performed to help define the optimal surgical or endovascular approach.

For preintervention studies, either multidetector CT (MDCT) or CTA is the optimal choice. Magnetic resonance angiography (MRA) may be substituted if CT cannot be performed (for example, because the patient is allergic to iodinated contrast material). However, MRA is usually performed with gadolinium contrast material, which is not suitable for patients with severe renal insufficiency. In such patients, the center where it is being performed must be able to perform MRA of AAAs without the use of gadolinium contrast material.

Other types of imaging studies that have been used in the past to delineate AAAs—including abdominal radiographs, intravenous urography and blood pool radionuclide imaging—are not recommended for diagnosis, surveillance or preintervention imaging.

Catheter arteriography has very limited utility in the preintervention evaluation of patients with AAAs, its sole utility being in patients with significant contraindications to both CTA (significant renal dysfunction) and MRA (significant renal dysfunction, cardiac pacemakers, claustrophobia). In patients with significant renal dysfunction, the combination of CT and the lower load of iodinated contrast material that can be used with intra-arterial injection may decrease the risk of contrast-induced nephropathy.

Many imaging studies for assessing AAA can also identify other diseases that could affect preoperative management of AAA, such as coronary artery disease and thoracic aortic aneurysm. Screening for AAA can also be performed during unrelated imaging studies, such as transthoracic echocardiography, peripheral vascular US, and imaging studies to assess coronary artery disease and stroke or transient ischemic attack. Aortic root size measured by transthoracic echocardiography has been shown to be an independent predictor of AAA.

Ultrasound

US examination of the abdominal aorta should be a dedicated examination and not a component of a generalized abdominal US study. If possible, complete longitudinal evaluation of the full extent of the aneurysm and involvement of common iliac arteries should be performed. These studies should include a measurement of the leading-edge to leading-edge AP diameter in the proximal, mid, and distal infrarenal aorta and of the common iliac arteries. The presence of mural thrombus has been associated with expansion rates and should be delineated. Right and left kidneys should be imaged to determine size, parenchymal thickness, and presence or absence of hydronephrosis. In order to permit US to be used instead of CT for AAA follow-up, interindividual reproducibility of diameter measurements should be within ≤4 mm. US tends to underestimate the size of aneurysms by 4 mm compared with CTA. Color Doppler imaging is not a necessary component of sonographic screening or surveillance examination. New, 3-dimensional (3-D) volumetric US techniques offer similar measurements but speed up imaging significantly.

Approximately 5% of AAAs will be juxtarenal or juxta/suprarenal, and it may not be possible to accurately delineate the upper margin of such aneurysms or the precise involvement of abdominal visceral branches by sonographic study. That is why a more definitive study, such as CTA, should be performed prior to intervention.

Computed Tomography

CT abdomen without contrast is diagnostically equivalent to US for AAA detection and is recommended in patients for whom US is not suitable. CT may be used as a diagnostic and preintervention study, suitable for patients presenting with pulsatile abdominal mass with or without clinical suspicion of contained aortic rupture and in planning endovascular or surgical intervention in patients with AAAs >5.5 cm in external AP diameter. In tortuous aneurysms, where a single dimension may be artifactually accentuated by the curvature of the aorta, the diameter of the aorta should be measured using multiplanar reformatted images that have been angle corrected for aortic curvature or curved planar reformatted images with automated centerline 3-D software.

CT abdomen with contrast provides some of the information that a CTA provides, such as aneurysm size, presence or absence of thrombus, and presence or absence of a dissection flap. CT abdomen with contrast does not give the precise size measurements, may not provide as much information about branch vessel involvement, and will not give the smooth 3-D renderings that a CTA will provide. However, CT abdomen with contrast performed in the portal venous phase provides more useful diagnostic information about extra-aortic pathology, such as liver, renal, and splenic pathology.

CT abdomen without and with contrast should be performed in patients with suspected contained rupture. CT without contrast is performed prior to CT with contrast to better diagnose dissecting hematoma in the lining of the intra-aortic thrombus (the crescent sign) and other signs consistent with imminent or contained rupture, including a draped aorta and adjacent vertebral erosion.

Computed Tomography Angiography

For the purposes of distinguishing between CT and CTA, ACR Appropriateness Criteria topics use the definition in the Practice Parameter for the Performance and Interpretation of Body Computed Tomography Angiography:

> *"CTA uses a thin-section CT acquisition that is timed to coincide with peak arterial or venous enhancement. The resultant volumetric dataset is interpreted using primary transverse reconstructions as well as multiplanar reformations and 3-D renderings."*

All elements are essential: (1) timing, (2) recons/reformats, and (3) 3-D renderings. Standard CTs with contrast also include timing issues and recons/reformats. Only in CTA, however, is 3-D rendering a required element. This corresponds to the definitions that the Centers for Medicare & Medicaid Services (CMS) have applied to the Current Procedural Terminology (CPT) codes.

Contrast-enhanced multidetector CTA is the best diagnostic and preintervention planning study, accurately delineating the location, size, and extent of aneurysm and the involvement of branch vessels, allowing for accurate quantitative 3-D measurements. CTA can also assess thrombus in aneurysm. The presence of thrombus affects the hemodynamic properties of the aorta. Larger thrombus and eccentric thrombus seem associated with rapid enlargement of the aneurysm and increased incidence of cardiovascular events. There are several research protocols that use modern CT technologies. Multiphase MDCT can assess compressibility of thrombus that can act as a biomechanical buffer. Using delayed imaging, aortic wall enhancement is associated with AAA diameter, biochemical markers of inflammation, and thrombus size. A grading scale based on CTA-derived biomechanical markers may predict aneurysm rupture. Short-term follow up by CTA does not decrease the suitability of aneurysms for endovascular intervention.

In patients with a suspected thoracoabdominal aortic aneurysm, CTA may be tailored for an angiographic examination of the chest, abdomen, and pelvis. In patients with suspected coexistent lower-extremity arterial disease, the arterial system from the diaphragm to the feet can be studied with MDCT or CTA.

Volume rendering, subvolume maximum intensity projection (MIP), and curved planar reformations are integral components of the 3-D analysis. Three-dimensional analysis is useful for measuring the correct size of an AAA. Semiautomated measurements of vessel diameter and length in relation to the proximal and distal aneurysm margins and branch vessels can be readily obtained with software supplied by multiple vendors. Additional research methods include electrocardiography (ECG)-gated MDCT that can assess decreased distensibility of aortic aneurysms. Advanced postprocessing of CT data can assess wall stress. Rapidly expanding AAAs have higher shoulder and wall stress. Calcification of the aneurysm increases wall stress and decreases the biomechanical stability of AAA. AAA peak wall stress at maximal blood pressure is higher in symptomatic or ruptured aneurysms compared to asymptomatic aneurysms.

In patients who have a contained rupture, a rapid CT angiographic study provides a template for decision-making about endovascular aneurysm repair or surgical aneurysmectomy.

Dual-energy CT and spectral CT have promise in the evaluation of patients with AAA. Both have the ability to create virtual noncontrast images, eliminating the need for true noncontrast images, with a potential for radiation dose reduction.

Magnetic Resonance Angiography

Contrast-enhanced MRA is an alternative and effective diagnostic and preintervention study. The acquisition speed and spatial resolution of contrast-enhanced MRA has improved with the introduction of parallel imaging techniques, narrowing the gap with CTA in relation to image quality. The introduction of blood pool contrast agents now enables longer image acquisition to improve image resolution. Caution should be used in patients with severe renal dysfunction, generally considered as estimated glomerular filtration rate (GFR) <30 mL/kg/minute, who may be at risk for nephrogenic systemic fibrosis. In these patients, a non–contrast-enhanced study may be substituted. Sequences and imaging expertise required for a full evaluation of AAA without contrast are becoming more mainstream.

Three-dimensional display techniques, including multiplanar reformation, MIP display, and volume rendering, are integral to the display and analysis of 3-D MRA. Cine techniques can also assess distensibility and, with suitable measurements of central venous pressure, can assess aortic compliance. Vessel wall shear stress can also be measured using newer 4-D flow-sensitive MRI techniques.

Catheter Arteriography (Aortography Abdomen)

Patients with significant contraindications to both CTA and MRA may have diagnostic catheter arteriography performed with a relatively low contrast material load following US documentation of AAA and/or noncontrast CT findings. Carbon dioxide may also be used as an alternative contrast agent for arteriography.

Catheter arteriography may not demonstrate the aneurysm diameter accurately, as only the contrast column of an aneurysm containing lining mural thrombus may be displayed. In patients with marginal renal function, rapid intra-arterial injection of a relatively low volume of dilute contrast material from a catheter located in the mid descending thoracic aorta can be used for a diagnostic CTA study, a technique called catheter-directed CTA.

Positron Emission Tomography

Although primarily a research tool, positron emission tomography using fluorine-18-2-fluoro-2-deoxy-D-glucose (FDG-PET) imaging has promise in the evaluation of patients with AAA. Increased metabolic activity and FDG uptake (maximum standardized uptake value >2.5) are noted in aneurysms and are even higher in infected aneurysms, inflammatory aneurysms, and symptomatic aneurysms and correlate well with histologic and metabolic evidence of inflammation. Increased FDG uptake is also seen in areas of high wall stress and rupture. Aneurysm calcification is unrelated to FDG uptake. More recently, FDG uptake has not been shown to be a predictor of aneurysm growth.

Summary

- The consensus of the literature supports aortic US as the initial imaging modality of choice when a pulsatile abdominal mass is present. Noncontrast CT may be substituted in patients for whom US is not suitable (for example, those with obese body habitus).
- US is recommended as a screening technique in the Medicare-eligible male population at highest risk.
- For definitive diagnosis and preintervention imaging, CTA and MRA are recommended.
- Currently, CTA is regarded as the superior test, as it is readily available, is robust, and provides high-spatial-resolution 3-D displays suitable for interventional planning as well as delineation of pathology in abdominal visceral arterial branches and extremity outflow vessels.
- Contrast-enhanced MRA has improved significantly in terms of speed and spatial resolution with the advent of parallel processing

techniques and blood pool contrast agents. It may replace CTA for interventional planning in patients for whom iodinated contrast is contraindicated.
- Noncontrast MRA sequences for full evaluation of AAA are becoming more mainstream and should only be performed in centers with expertise in this technique.
- Appropriate preintervention measurements of the aortoiliac arterial system can be obtained with either technique.
- Both CTA and MRA can be used for thoracoabdominal aortic and extremity studies, all in the same imaging session.
- FDG-PET remains primarily a research tool but shows promise for assessing the metabolic activity of aneurysms.

Abbreviations

- CT, computed tomography
- CTA, computed tomography angiography
- FDG-PET, fluorine-18-2-fluoro-2-deoxy-D-glucose positron emission tomography
- IV, intravenous
- MRA, magnetic resonance angiography
- US, ultrasound

Relative Radiation Level Designations

Relative Radiation Level*	Adult Effective Dose Estimate Range	Pediatric Effective Dose Estimate Range
O	0 mSv	0 mSv
☢	<0.1 mSv	<0.03 mSv
☢☢	0.1-1 mSv	0.03-0.3 mSv
☢☢☢	1-10 mSv	0.3-3 mSv
☢☢☢☢	10-30 mSv	3-10 mSv
☢☢☢☢☢	30-100 mSv	10-30 mSv
*RRL assignments for some of the examinations cannot be made, because the actual patient doses in these procedures vary as a function of a number of factors (e.g., region of the body exposed to ionizing radiation, the imaging guidance that is used). The RRLs for these examinations are designated as "Varies."		

Clinical Algorithm(s)

Algorithms were not developed from criteria guidelines.

Scope

Disease/Condition(s)

Pulsatile abdominal mass, suspected abdominal aortic aneurysm (AAA)

Guideline Category

Diagnosis

Evaluation

Screening

Clinical Specialty

Cardiology

Family Practice

Internal Medicine

Nuclear Medicine

Radiology

Intended Users

Advanced Practice Nurses

Health Care Providers

Health Plans

Hospitals

Managed Care Organizations

Physician Assistants

Physicians

Students

Utilization Management

Guideline Objective(s)

To evaluate the appropriateness of imaging procedures for a pulsatile abdominal mass and suspected abdominal aortic aneurysm (AAA)

Target Population

Patients with a pulsatile abdominal mass and a suspected abdominal aortic aneurysm

Interventions and Practices Considered

1. Ultrasound (US) aorta, abdomen
2. Computed tomographic angiography (CTA), abdomen with intravenous (IV) contrast
3. Magnetic resonance angiography (MRA), abdomen
    - Without and with IV contrast
    - Without IV contrast
4. Computed tomography (CT), abdomen
    - Without IV contrast
    - With IV contrast
    - Without and with IV contrast
5. Aortography, abdomen
6. Fluorine-18-2-fluoro-2-deoxy-D-glucose positron emission tomography (FDG-PET)/CT, abdomen

Major Outcomes Considered

- Utility of imaging procedures in the diagnosis and evaluation of pulsatile abdominal mass, suspected aortic aneurysm
- Sensitivity, specificity, and accuracy of imaging procedures in the diagnosis and evaluation pulsatile abdominal mass, suspected aortic

aneurysm

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Literature Search Summary

Of the 65 citations in the original bibliography, 57 were retained in the final document.

A literature search was conducted in April 2015 and June 2016 to identify additional evidence published since the *ACR Appropriateness Criteria® Pulsatile Abdominal Mass–Suspected Abdominal Aortic Aneurysm* topic was finalized. Using the search strategies described in the literature search companion (see the "Availability of Companion Documents" field), 2624 articles were found. Twenty-one articles were added to the bibliography. Eighty-eight articles were not used as they were duplicates already cited in the original bibliography or captured in more than one literature search. The remaining articles were not used due to either poor study design, the articles were not relevant or generalizable to the topic, or the results were unclear or biased.

The author added 5 citations from bibliographies, Web sites, or books that were not found in the literature searches.

One citation is a supporting document that was added by staff.

See also the American College of Radiology (ACR) Appropriateness Criteria® literature search process document (see the "Availability of Companion Documents" field) for further information.

Number of Source Documents

Of the 65 citations in the original bibliography, 57 were retained in the final document. The literature search conducted in April 2015 and June 2016 identified 21 articles that were added to the bibliography. The author added 5 citations from bibliographies, Web sites, or books that were not found in the literature searches. One citation is a supporting document that was added by staff.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Definitions of Study Quality Categories

Category 1 - The study is well-designed and accounts for common biases.

Category 2 - The study is moderately well-designed and accounts for most common biases.

Category 3 - The study has important study design limitations.

Category 4 - The study or source is not useful as primary evidence. The article may not be a clinical study, the study design is invalid, or conclusions are based on expert consensus.

The study does not meet the criteria for or is not a hypothesis-based clinical study (e.g., a book chapter or case report or case series description);

Or

The study may synthesize and draw conclusions about several studies such as a literature review article or book chapter but is not primary evidence;

Or

The study is an expert opinion or consensus document.

Category M - Meta-analysis studies are not rated for study quality using the study element method because the method is designed to evaluate individual studies only. An "M" for the study quality will indicate that the study quality has not been evaluated for the meta-analysis study.

Methods Used to Analyze the Evidence

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

The topic author assesses the literature then drafts or revises the narrative summarizing the evidence found in the literature. American College of Radiology (ACR) staff drafts an evidence table based on the analysis of the selected literature. These tables rate the study quality for each article included in the narrative.

The expert panel reviews the narrative, evidence table and the supporting literature for each of the topic-variant combinations and assigns an appropriateness rating for each procedure listed in the variant table(s). Each individual panel member assigns a rating based on his/her interpretation of the available evidence.

More information about the evidence table development process can be found in the ACR Appropriateness Criteria® Evidence Table Development document (see the "Availability of Companion Documents" field).

Methods Used to Formulate the Recommendations

Expert Consensus (Delphi)

Description of Methods Used to Formulate the Recommendations

<u>Rating Appropriateness</u>

The American College of Radiology (ACR) Appropriateness Criteria methodology is based on the RAND Appropriateness Method. The appropriateness ratings for each of the procedures or treatments included in the Appropriateness Criteria topics are determined using a modified Delphi method. A series of surveys are conducted to elicit each panelist's expert interpretation of the evidence, based on the available data, regarding the appropriateness of an imaging or therapeutic procedure for a specific clinical scenario. The expert panel members review the evidence presented and assess the risks or harms of doing the procedure balanced with the benefits of performing the procedure. The direct or indirect costs of a procedure are not considered as a risk or harm when determining appropriateness. When the evidence for a specific topic and variant is uncertain or incomplete, expert opinion may supplement the available evidence or may be the sole source for assessing the appropriateness.

The appropriateness is represented on an ordinal scale that uses integers from 1 to 9 grouped into three categories: 1, 2, or 3 are in the category "usually not appropriate" where the harms of doing the procedure outweigh the benefits; and 7, 8, or 9 are in the category "usually appropriate" where the benefits of doing a procedure outweigh the harms or risks. The middle category, designated "may be appropriate," is represented by 4, 5, or 6 on the scale. The middle category is when the risks and benefits are equivocal or unclear, the dispersion of the individual ratings from the group median rating is too large (i.e., disagreement), the evidence is contradictory or unclear, or there are special circumstances or subpopulations which could influence the risks or benefits that are embedded in the variant.

The ratings assigned by each panel member are presented in a table displaying the frequency distribution of the ratings without identifying which members provided any particular rating. To determine the panel's recommendation, the rating category that contains the median group rating without disagreement is selected. This may be determined after either the first or second rating round. If there is disagreement after the second rating round, the recommendation is "May be appropriate."

This modified Delphi method enables each panelist to articulate his or her individual interpretations of the evidence or expert opinion without excessive influence from fellow panelists in a simple, standardized, and economical process. For additional information on the ratings process see the Rating Round Information document.

Additional methodology documents, including a more detailed explanation of the complete topic development process and all ACR Appropriateness Criteria topics can be found on the ACR Web site (see also the "Availability of Companion Documents" field).

Rating Scheme for the Strength of the Recommendations

Not applicable

Cost Analysis

Population-based ultrasound (US) screening studies have been recommended and have proved cost-effective for male patients >65 years of age, despite the fact that one-fifth of all ruptured abdominal aortic aneurysms (AAAs) occur in these patients.

Method of Guideline Validation

Internal Peer Review

Description of Method of Guideline Validation

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The recommendations are based on analysis of the current medical evidence literature and the application of the RAND/UCLA appropriateness method and expert panel consensus.

Summary of Evidence

Of the 84 references cited in the *ACR Appropriateness Criteria® Pulsatile Abdominal Mass, Suspected Abdominal Aortic Aneurysm* document, 1 is a good-quality therapeutic reference. Additionally, 82 references are categorized as diagnostic references including 10 good-quality studies, and 15 quality studies that may have design limitations. There are 56 references that may not be useful as primary evidence. One reference is a meta-analysis study.

Although there are references that report on studies with design limitations, 22 well-designed or good-quality studies provide good evidence.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Imaging studies are important in diagnosing the cause of a pulsatile abdominal mass and, if an abdominal aortic aneurysm (AAA) is found, in determining its size, involvement of abdominal branches (both visceral and parietal), and any associated significant stenosis or aneurysm involving abdominal visceral and extremity arteries that may aid in treatment planning. Imaging studies should also categorize the extent of aneurysm (i.e., infrarenal aorta; infrarenal aorta and iliac artery; isolated iliac artery; or juxtarenal, suprarenal, or thoracoabdominal aorta). Imaging can also be used for routine surveillance of AAAs.

Potential Harms

Caution should be used when administering contrast in patients with severe renal dysfunction, generally considered as estimated glomerular filtration rate <30 mL/kg/min, who may be at risk for nephrogenic systemic fibrosis. In these patients, a non–contrast-enhanced study may be substituted.

Relative Radiation Level Information

Potential adverse health effects associated with radiation exposure are an important factor to consider when selecting the appropriate imaging procedure. Because there is a wide range of radiation exposures associated with different diagnostic procedures, a relative radiation level (RRL) indication has been included for each imaging examination. The RRLs are based on effective dose, which is a radiation dose quantity that is used to estimate population total radiation risk associated with an imaging procedure. Patients in the pediatric age group are at inherently higher risk from exposure, both because of organ sensitivity and longer life expectancy (relevant to the long latency that appears to accompany radiation exposure). For these reasons, the RRL dose estimate ranges for pediatric examinations are lower as compared to those specified for adults. Additional information regarding radiation dose assessment for imaging examinations can be found in the American College of Radiology (ACR) Appropriateness Criteria® Radiation Dose Assessment Introduction document (see the "Availability of Companion Documents" field).

Contraindications

Contraindications

- Significant renal dysfunction is a contraindication for computed tomography angiography (CTA).
- Significant renal dysfunction, cardiac pacemakers, and claustrophobia are contraindications for magnetic resonance angiography (MRA).

Qualifying Statements

Qualifying Statements

- The American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those examinations generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the U.S. Food and Drug Administration (FDA) have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.
- ACR seeks and encourages collaboration with other organizations on the development of the ACR Appropriateness Criteria through society representation on expert panels. Participation by representatives from collaborating societies on the expert panel does not necessarily imply society endorsement of the final document.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

IOM Domain

Effectiveness

Identifying Information and Availability

Bibliographic Source(s)

Reis SP, Majdalany BS, AbuRahma AF, Collins JD, Francois CJ, Ganguli S, Gornik HL, Kendi AT, Khaja MS, Norton PT, Sutphin PD, Rybicki FJ, Kalva SP, Expert Panel on Vascular Imaging. ACR Appropriateness CriteriaÂ® pulsatile abdominal mass, suspected abdominal aortic aneurysm. Reston (VA): American College of Radiology (ACR); 2016. 10 p. [84 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2016

Guideline Developer(s)

American College of Radiology - Medical Specialty Society

Source(s) of Funding

The American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria®.

Guideline Committee

Committee on Appropriateness Criteria, Expert Panel on Vascular Imaging

Composition of Group That Authored the Guideline

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Financial Disclosures/Conflicts of Interest

Not stated

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Desjardins B, Rybicki FJ, Dill KE, Flamm SD, Francois CJ, Gerhard-Herman MD, Kalva SP, Mansour MA, Mohler ER III, Oliva IB, Schenker MP, Weiss C, Expert Panel on Vascular Imaging. ACR Appropriateness Criteria® pulsatile abdominal mass, suspected abdominal aortic aneurysm. [online publication]. Reston (VA): American College of Radiology (ACR); 2012. 6 p. [65 references]

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Available from the American College of Radiology (ACR) Web site.

Availability of Companion Documents

The following are available:

- ACR Appropriateness Criteria®. Overview. Reston (VA): American College of Radiology; 2015 Oct. 3 p. Available from the American College of Radiology (ACR) Web site.
- ACR Appropriateness Criteria®. Literature search process. Reston (VA): American College of Radiology; 2015 Feb. 1 p. Available from the ACR Web site.
- ACR Appropriateness Criteria®. Evidence table development. Reston (VA): American College of Radiology; 2015 Nov. 5 p. Available from the ACR Web site.
- ACR Appropriateness Criteria®. Topic development process. Reston (VA): American College of Radiology; 2015 Nov. 2 p. Available from the ACR Web site.
- ACR Appropriateness Criteria®. Rating round information. Reston (VA): American College of Radiology; 2015 Apr. 5 p. Available from the ACR Web site.
- ACR Appropriateness Criteria®. Radiation dose assessment introduction. Reston (VA): American College of Radiology; 2016. 4 p. Available from the ACR Web site.
- ACR Appropriateness Criteria®. Manual on contrast media. Reston (VA): American College of Radiology; 2016. 128 p. Available from the ACR Web site.
- ACR Appropriateness Criteria®. Procedure information. Reston (VA): American College of Radiology; 2016 May. 2 p. Available from the ACR Web site.
- ACR Appropriateness Criteria® pulsatile abdominal mass, suspected abdominal aortic aneurysm. Evidence table. Reston (VA): American College of Radiology; 2016. 39 p. Available from the ACR Web site.
- ACR Appropriateness Criteria® pulsatile abdominal mass, suspected abdominal aortic aneurysm. Literature search. Reston (VA): American College of Radiology; 2016. 2 p. Available from the ACR Web site.

Patient Resources

None available

NGC Status

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